DOCUMENT RESUME

ED 263 851 HE 018 902

AUTHOR Frierson, Henry T.
TITLE Strategies for Effective Learning.
PUB DATE 85
NOTE 25p.
PUB TYPE Guides - Non-Classroom Use (055)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Attention; *College Students; *Comprehension; Higher Education; *Learning Strategies; *Memory; Mnemonics; *Study Skills; Visualization

ABSTRACT

Suggestions are offered for applying learning techniques for a variety of learning situations. The approaches are applicable to learning medical school content as well as other advanced educational content. Ways to control external distractors are suggested, including a systematic approach to completing large tasks, such as writing a research paper. Controlling internal distractors (negative self-talk) is briefly addressed, as well as Fenker's Study Management System, which can be used to enhance learning by monitoring learning behavior. Concentration is described as effectively applying self-monitoring techniques to learn subject matter. Attention is also directed to: methods for enhancing concentration and promoting active learning; two techniques for memorizing abstract material (mnemonics and linking); imagery to form mental pictures of objects, words, or scenes; and building a framework during reading and when previewing material to be learned. The following comprehension strategies are discussed: paraphrasing, the question-answer technique, peer questioning and teaching, imagery techniques, organizing information, reviewing content, forming a language for comprehension, and building mental networks. (SW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED263851

STRATEGIES FOR EFFECTIVE LEARNING

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Henry T. Frierson

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Henry T. Frierson, Jr., Ph.D.

Office of Research and Development for Education in the Health Professions

University of North Carolina

School of Medicine

Chapel Hill, NC 27514

HE018902

© All Rights Reserved

1985

STRATEGIES FOR EFFECTIVE LEARNING

CONTENTS

Topics		Page
I.	Introduction	1
II.	Contolling Internal and External Distractors	2
III.	Monitoring Learning Behavior	3
IV.	Concentration and Active Learning	4
V.	Memory Strategies	6
VII.	Comprehension Strategies	10
VIII.	Conclusion	20

STRATEGIES FOR EFFECTIVE LEARNING

Henry T. Frierson, Jr., Ph.D.

INTRODUCTION

This paper contains valuable suggestions for applying useful learning techniques for a variety of learning situations and for a wide array of subjects. Much of the information presented here was culled from Richard Fenker's(1) nice little book entitled Stop Studying: Start Learning. Fenker's book was enthusiastically recommended to me by Paul Berghoff of Pembroke State University. Immediately upon receiving it, I found that the learning strategies suggested were based on those developed by Donald Dansereau at Texas Christian University. Among the places Dansereau's approaches are currently being taught is at the University of Texas Medical Branch at Galveston. Thus, the approaches suggested here are very applicable to learning medical school content as well as other advanced educational content. I urge you to take the time and read what I have outlined, and then try those approaches suggested. I believe you will find the effort worthwhile.

1. R. Fenker. Stop Studying: Start Learning (Tangram Press: Fort Worth, 1982).

CONTROLLING INTERNAL AND EXTERNAL DISTRACTORS

For effective learning to occur you must be able to control both external distractors and internal distractors or negative self-talk. Internal distractors, for example, are disruptive and can play havoc on your learning effectiveness. Internal distractors are those negative things you say to yourself such as: "I'm tired and I don't feel like studying this stuff right now." Sounds familiar? One way of controlling internal distractors is to keep in mind that what you tell yourself can change what you're feeling, i.e. use positive instead of negative self-talk.

Fenker(2) found that approximately 60% of his students had more negative self-talk than neutral or positive self-talk. He also believes that of those students having learning problems, 80-90 percent have self-talk that is predominantly negative. To reduce and control negative self-talk try the following:

* Imagine yourself overcoming any problems you feel confronted with.
* Put yourself in the situation that is related to the problem or the cause of stress and think through how you would resolve the problem.

External distractors are interferences occurring externally such as sounds, people, activities, and other things that draw your attention away from the learning task. For controlling external distractors, behavioral or self-control skills should be used. Below are some useful approaches you might apply for controlling external distractors:

* Deadline approach
  - Set deadlines for busywork not requiring a great deal of thought,

2. Ibid.

just time and effort to finish it.

* Systematic approach
  - Use the approach when you must complete large tasks requiring much time, thought, or creativity.
  - Break up the task and treat it systematically... eg. writing a major paper: 1) Research topic, 2) Gather resources, 3) Outline paper, and 4) Write paper.
  - For example, when writing a major paper:
    - Research the topic
    - Gather needed resources
    - Outline paper
    - Write draft
    - Make revisions

Be sure to reward yourself when you accomplish your goals. This form of self-directed behavior modification will promote internal or self control and also enhances your completing required or desired tasks.

MONITORING LEARNING BEHAVIOR

This section outlines Fenker's Study Management System which can be used for enhancing learning by monitoring your learning behavior.

* Outline the whole array of behavior connected with your learning activities.
  - Such an outline will enable you to determine what is wrong, for example:
  - The following might be what you list as your usual behavior before studying
    - Eat a large meal
    - Gather books and materials

- Turn on the television
- Begin studying

- By assessing your list, you might see aspects that need changing

* State your goals clearly.
  - For example, I will read chapters 4 and 5 in Biochemistry this week
* Generate subgoals or objectives from your goals.
  - For example, on Monday, I will outline pages 120-140 from 7:00 - 8:30 p.m.
  - Make your objectives specific so the outcomes can be counted, measured, and observed.
* Think small:
  - You will find that it's usually best to start with objectives small enough to be accomplished.
  - Then expand those objectives when appropriate.
  - Keep in mind that it's always important to be realistic.

Principles to use for monitoring your learning behavior:

* Positive reinforcement: reward yourself for completing a task.
* Negative reinforcement: deny yourself a reward if you fail to accomplish what you planned.
* Premack Principle: until a task is completed, do not engage in reinforcing behavior, for example talking on the phone, hobbies, etc.

A self-monitoring strategy should be used when you recognize that your mind is wandering away from the task at hand. Self-monitoring is useful in letting you know when you are getting off-track. You can use positive self-talk to get back on track. When you do find yourself becoming sidetracked, however, there might be a need to move to another task.

The following are separate ways to increase productivity:

* Set goals.
    - Goals should be fairly short-term and immediate.
    - Avoid vague long-term goals, e.g., "I am going to do better in biochemistry."
    - In such instances you really haven't described how you are going to do better, e.g. the statement "I will complete all biochemistry reading assignments prior to class time," is more descriptive.
* Monitor the learning process necessary to reach the goal through some of the self-monitoring procedures described.
    - Keep tabs on your progress.
* Immediately recognize any distraction, mental or otherwise and tell yourself to get back on track.
* Make a firm decision regarding what you will do if you recognize you are not on track.
* When you find that you have been sidetracked, make every effort to return to the original task.
* When certain situations suggest a change is needed, select another task more fitting to your state of mind.
    - A task that might be more enjoyable, thus enabling you to concentrate more.
* Or, you may return to the original task but with a new processing strategy.
* Or, you may find it more appropriate to stop and rest.

CONCENTRATION AND ACTIVE LEARNING

In this context, concentration can be described as effectively applying self-monitoring techniques to learn subject matter. Self-monitoring helps to keep learners on track. The learning process requires continual monitoring of distractors and activity levels. The following are methods for enhancing concentration:

* Pick out one special area for studying or for doing work related projects.
    - Other non-work related activities should be done elsewhere.
    - The regular workplace will eventually come to serve as a stimulus for effective concentration.
* Establish a regular time for studying and consistently use that time studying or doing work related projects.
    - Those time periods should be in blocks that you can control and should be as free from interruption as possible.
* Eliminate all audio and visual distractors at the workplace.
* Force yourself to increase your level of involvement with the subject matter material: e.g., instead of just reading the textbook, increase your activity level: underlining or taking notes from important sections is one example.
    - The ability to increase your activity level when conducting work tasks is a crucial self-monitoring skill.

Do <u>not</u> reward poor concentration habits. For example, when you find your concentration waning, do not terminate the task at hand and begin another more pleasant activity such as taking a break to talk on the telephone or go to the refrigerator. For such periods you might tell yourself you are going to make an effort to concentrate while reading at least three more pages before stopping. <u>Reward only good concentration or behavior and always try to end your studying</u>

with a degree of success, such as a completed section or chapter.

For effective learning, it is also important to be an active learner. For instance, just reading by itself is usually not effective for learning difficult material because reading is generally a passive activity. There are other methods you can apply that will promote a more active learning pattern. Below are some of the methods you may find useful to enhance learning:

* Underline or use highlight markers (see p. 20).
* Mark or write in the margins (see p. 21).
* Organize the contents into a framework useful to you (see pp. 12-13 and pp. 16-21).
* Outline chapters (see pp. 12-13).
* Paraphrase orally or in writing (see pp. 14-15).
* Form imagery associations (see p. 12 and p. 16).
* Construct mnemonics (see pp. 9-10).
* Form questions and generate answers (see p. 15).
* Imagine yourself teaching the material to someone (see pp. 15-16).
* Diagram relationships linking between parts of the text (see pp. 10-12).
* Apply a comprehensive language (see pp. 17-20).

Whenever you have lapses in concentration due to boredom, fatigue, or saturation with the subject matter, it may prove beneficial to switch to subject matter that is more stimulating. You should quickly be aware when your concentration lapses, and move immediately to do something about it.

MEMORY STRATEGIES

Memory, the process used to store knowledge or information, contains two distinct stages: 1) coding or storage of information and 2) recall of information. Developing a good memory depends on learning material in ways that

allow you to easily retrieve information when needed.

Meaningful learning occurs when you have a structure or framework for organizing new material, because the structure is based on previous experience with similar or related material. Meaningful learning can be described as memorization that is related to previously learned material. On the other hand, with rote learning, there is little or no structural framework for interpreting new material. Moreover, rote learning tasks are difficult and time consuming.

Mnemonics and Linking

Two major techniques for memorizing abstract material are mnemonics and linking. Mnemonics involve the use of a key word or phrase to represent a set of words. For example, a classic mnemonic used by medical students is "Pvt. Tim Hall" which is a mnemonic for the essential amino acids. In this instance, each letter in the rank and name represents the first letter of the amino acid:

Phenylalanine

Valine

Threonine

Tryptophan

Isolencine

Methionine

Histidine

Arginine

Leucine

Lysine

Another classic mnemonic used by medical students is: "On old Olympus towering tops, a Fin and German viewed some hops." This is a mnemonic for the 12 cranial nerves. The first letter of each word in the rhyme represents the

first letter and numerical craniocaudal sequence of each cranial nerve:

CN I Olfactory

CN II Optic

CN III Occulomotor

CN IV Trochlear

CN V Trigerminal

CN VI Abducent

CN VII Facial

CN VIII Accoustic (Vestibulocochlear)

CN IX Glossopharyngeal

CN X Vagus

CN XI Spinal Accessory

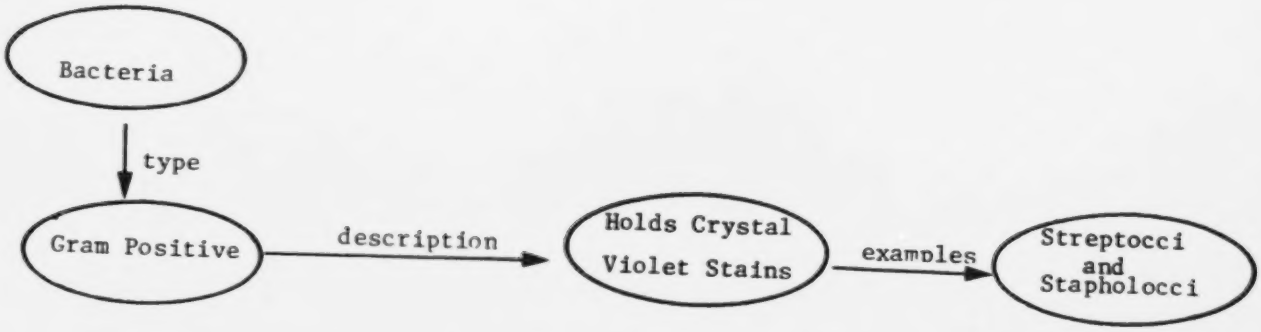
CN XII Hypoglossal

Mnemonics can provide a framework that gives meaning to the material that is to be learned. There are, however, potential problems associated with using mnemonics. For example, developing mnemonics can be time-consuming since each new set requires a different mnemonic. When the list of items exceeds five or six words, it may be very difficult to find an appropriate mnemonic in the form of a word or phrase. Also, mnemonics may not provide enough information to effectively aid in recall; for example, more information may be needed than a first letter for recalling a word or phrase.

Linking, on the other hand, is an association between something you want to remember and something already in your memory. The objetive is to form an association between each of the items to be remembered and a corresponding word in the linking system. See Figure 1 as an example of a network illustrating relationships (links) between concepts (nodes). The relationships (links) between the concepts (nodes) bacteria, gram positive, holds crystal violet

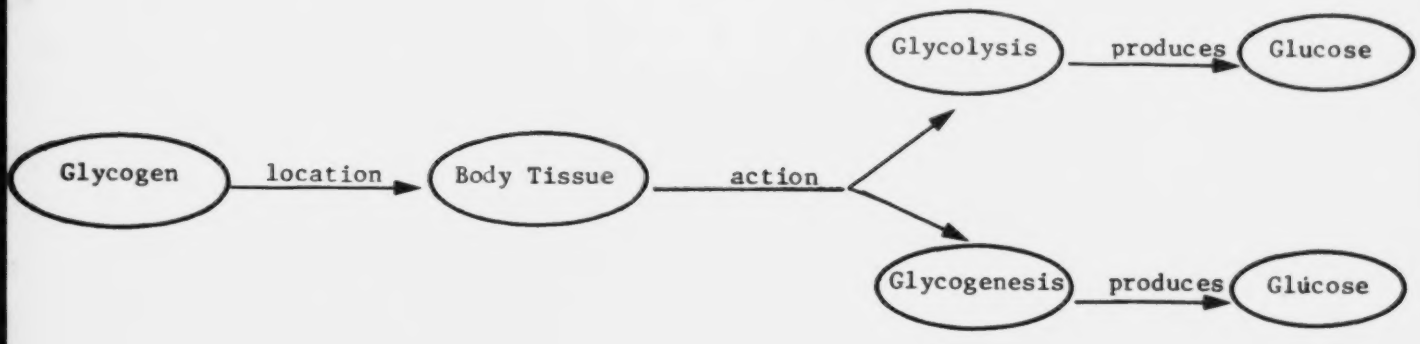
stain, and both staphlococci and streptococci can thus be described: gram positive bacteria, like streptococci and staphlococci can hold crystal violet stains.

Figure 1



For another example, let's say a student is attempting to learn some information about where glycogen--the body's principle carbohydrate reserve--is stored and how it is converted into glucose. A linking system as shown in Figure 2 could be constructed.

Figure 2



If sequence is important, be sure the linking system order matches the correct conceptual sequence such as that found in the specific breakdown of glycogen in the liver.

Imagery and Building Conceptual Framework

Two effective learning techniques are imagery and building conceptual framework. Both are methods for elaboration and can be used as foundations to build further knowledge.

Imagery is the process of forming mental pictures of objects, words or scenes. Keep in mind that mental pictures are relatively long lasting and this is an approach you should definitely make an effort to apply. Below are techniques that you can apply:

* When visualizing items make them very large or very small.
    - Stretch the images far out of proportion to make them more unusual.
* Make the images as bizarre or unusual as possible.
* Give the images action.
    - Action or movement helps bond the links created and makes the images easy to remember.

Building a framework can occur when you preview materials you must learn. For example, when skimming a chapter in a textbook, seek out organizational cues such as headings, charts, diagrams, illustrations, and examples. Skimming should only take a few minutes. But if the content is complex, it might be best to outline the chapter before starting the reading process. During actual reading, the outline can be changed and details added where necessary. Outlines

can be used as good sources for reviewing subject matter.

COMPREHENSION STRATEGIES

Comprehension skills are necessary for understanding, rather than memorizing, new material. Two major things will occur if the learner understands an idea: 1) The idea will be more easily remembered because it is meaningfully connected with previous learning experiences, and 2) it probably has generality and can be applied in other situations. Comprehension is the key to learning a subject.

Since large numbers of concepts cannot be memorized by rote methods, you have probably found conceptual learning, as found in math and science, to be relatively difficult. Essentially, concepts are usually applied in a variety of situations, and simply memorizing a concept means the learner can apply that concept only in the context in which it was presented. Concepts that have been memorized by rote are inflexible, specific, and useless in novel situations.

The use of comprehension strategies is important for effective learning. Comprehension strategies are similar in many ways to memory strategies, for both help form links between new and old material.

Comprehension is a continual process of generalization. The learner first develops narrow mental frameworks for understanding concepts and then constantly broadens them to fit new information.

Comprehension is also a process of organization. The mental frameworks are not only broadened but become more detailed and better organized. For example, the concept protein takes on expanded and more detailed meaning by someone who has studied biochemistry as compared to someone who had not taken a course in the subject.

Because effective learning of concepts involves comprehension, not

memorization, the learner should first try to understand why the concept works in the particular examples given. Then, how the concept would apply in new situations. The better your comprehension, the further the concept can be extended beyond the original example in explaining or solving problems under new and different circumstances. Thus, understanding concepts facilitates learning and helps in developing a powerful, expandable mental framework. Some effective comprehension strategies that you can apply are:

* Paraphrasing
* The question-answer (Q/A) technique
* Acting as an instructor
* Imagery techniques
* Organizing information
* Revewing content
* Forming a language for comprehension
* Building mental networks

The above strategies are discussed in the next five sections.

Paraphrasing

Paraphrasing is the process of restating, in your own terms, something you read or heard. The process is useful when the learner is not sure he understands what he is reading or hearing. By directly restating a new idea in familiar terms and concepts, the learner will gain some understanding of the idea. Moreover, using familiar terms will guarantee that the paraphrase will be associated with information previously learned. As understanding evolves, paraphrasing will become more sophisticated. The technique is an excellent way to check your understanding of subject matter. If comprehension of subject is good, then paraphrasing will be fairly easy; however, if your understanding of

the content is only superficial and is dependent on terms not in your language, then the process of paraphrasing becomes an almost impossible task and quite ineffective. Hence, when parapharasing, be sure to use terms you understand.

The Q/A Technique

In applying the Q/A technique, you should formulate questions about the material you are studying and then try to answer them. When you've understood a topic fairly well, it is usually easy to ask a question illustrating your understanding. This is another way to check your initial understanding of the material. If possible, you should not employ questions that can be answered with one or two words since they are generally less informative as are questions that are vague or essentially unanswerable.

The Q/A technique is an excellent method for improving comprehension. The technique is an active process that directs your attention to important points in the material. Asking meaningful questions about a subject allows you to proficiently perform other tasks, e.g., class participation, exam taking, and becoming actively involved in conversations and discussions related to the topic. The Q/A technique also helps in identifying portions of subject matter you do not understand.

Acting As An Instructor

Acting as an instructor is another useful comprehension strategy. Explaining difficult material to another person is effective for improving understanding and examination performance. Moreover, participating in a well-functioning and interactive learning group on a regular basis, where peers help question and teach each other, can serve to enhance learning overall. That in itself is significant, but in addition, such groups can often serve as

sources of emotional support for the participants.

Imagery

Another excellent technique for facilitating comprehension is to actually do what you are attempting to learn. But since that procedure is often not possible, try to visualize doing what you are learning. Imagery, as discussed earlier, is a powerful technique for understanding how parts of a problem or facts associated with a concept fit together to form a whole. Further, imagery is useful for understanding visual material that is difficult to explain verbally even when using paraphrasing or Q/A techniques.

Organizing Information

Since subject matter very seldom exists in isolation, knowledge of organizational principles is vital for good comprehension. The information is usually part of a large collection of knowledge that is organized in some manner. Outlining is an example of an effective method for organizing information.

Reviewing Content

To improve your understanding of subject matter topics, these comprehension strategies should be used after you have read or skimmed the subject matter and are beginning to review the material. The majority of your study time should actually be spent reviewing, i.e., applying a comprehension strategy to material you wish to learn. Simply reading and rereading when you study is likely to result in less effective learning because it is such a passive activity. Actually, a reviewing to reading ratio of about 2:1 or better yet, 3:1 (e.g., 3 hours reviewing to one hour of reading), is better than using most

of your study time solely reading the material. For example, if you have four hours set aside for assigned reading, it would be more productive to spend the first hour reading to acquire a general view of the content and then use the remaining three hours for reviewing selected important areas to gain a better understanding of the material and for establishing a solid knowledge base on which you can build additional information.

Forming A Language for Comprehension

As you monitor your own learning activities, it is quite helpful to formulate a language of comprehension in terms meaningful to you. For example, the following categories and subcategories of comprehensive terms that are in essence operational, can help you to assess your knowledge and to build your understanding when you apply them in your efforts to learn content:

* Describe
    - Give a description
    - Characterize
    - Label
    - Elaborate
    - Identify parts, features, attributes, components
* Define
    - Give a definition
    - Explain
    - Identify
    - Know the meaning of
    - Analyze
* Classify
    - Fit into a classification scheme

- Note what it is a part of
- Categorize
- Identify as a member of a group, family, subset or organization

* Paraphrase
  - Restate
  - Put into different words
  - Repeat using your own language
  - Articulate

* Compare
  - Contrast
  - Relate
  - Examine both sides
  - Discriminate
  - Form analogies
  - Find similarities or differences
  - Express the relationship between things in time or space

* Organize
  - Identify the basic structure
  - Divide into classes or categories
  - Diagram
  - Relate the parts in some orderly way
  - Put the parts together

* Can influence something
  - Leads to
  - Has an effect on
  - Causes or partially causes some results
  - Produces a change

- Expresses an interaction between two things
- Sees a cause-effect relationship

* To be influenced or affected by something
  - Determine how a cause produced a particular effect
  - Determine the result of an action
  - Note the consequences
  - See forces operating that produce an end result

* Citing evidence
  - Present supporting data for
  - Provide relevant information
  - Offer favorable arguments
  - Demonstrate the logic of a position
  - Give rationale for
  - Refute counter-arguments
  - Rule out contradictory information

The following are examples of questions you can ask (yourself or others for self-monitoring purposes) to improve your understanding of content.

- What is it a part of?
- What does it influence?
- What influences it?
- How do you describe it?
- What does it compare to?
- What does it do?
- How does it do it?

Although you may have a "feeling" when you do or do not understand a body of knowledge, you may still need to communicate your degree of understanding to

others via a written test or some other means such as through a verbal presentation. The above terms allow you to describe how much you have actually comprehended. This will also allow you to discern where and why you have gaps in your knowledge of the material. A language of comprehension will help avoid those situations where although you know you do not understand a specific body of content, you cannot determine why or what to do about it because you cannot pinpoint the source of your lack of understanding.

Building Mental Networks

In most instances, comprehension depends on building mental networks where terms or concepts are linked in some manner (See Figure 3). In building a comprehension network for new or difficult material, give the following suggestions a try:

* Leave trail markers -- they note the important points in your text material.
  - Underline, mark or highlight the ideas, concepts, or terms you think are important.
  - Also, mark those areas you do not understand clearly with a special notation, e.g., a question mark.
* Review the material and elaborate.
  - List all the terms or concepts you underlined on the left hand side of a piece of paper.
  - Reread the passage more carefully, paying close attention to the underlined terms.
  - If you learn anything new about the underlined terms or how they relate to each other, make a note of this in the right hand column.

- Or, if you find a definition for a term you didn't understand, jot it down in the right hand column.

* Organize as many terms and concepts as possible into an illustrated network (see Figure 2 as an example), then:
  - Place the terms that are closely related near each other.
  - Draw lines between those terms that are linked together in important ways.
  - Label the links that connect them.
  - If unsure how they are related, research the relevant parts for information or ask someone (e.g. the instructor or a classmate).

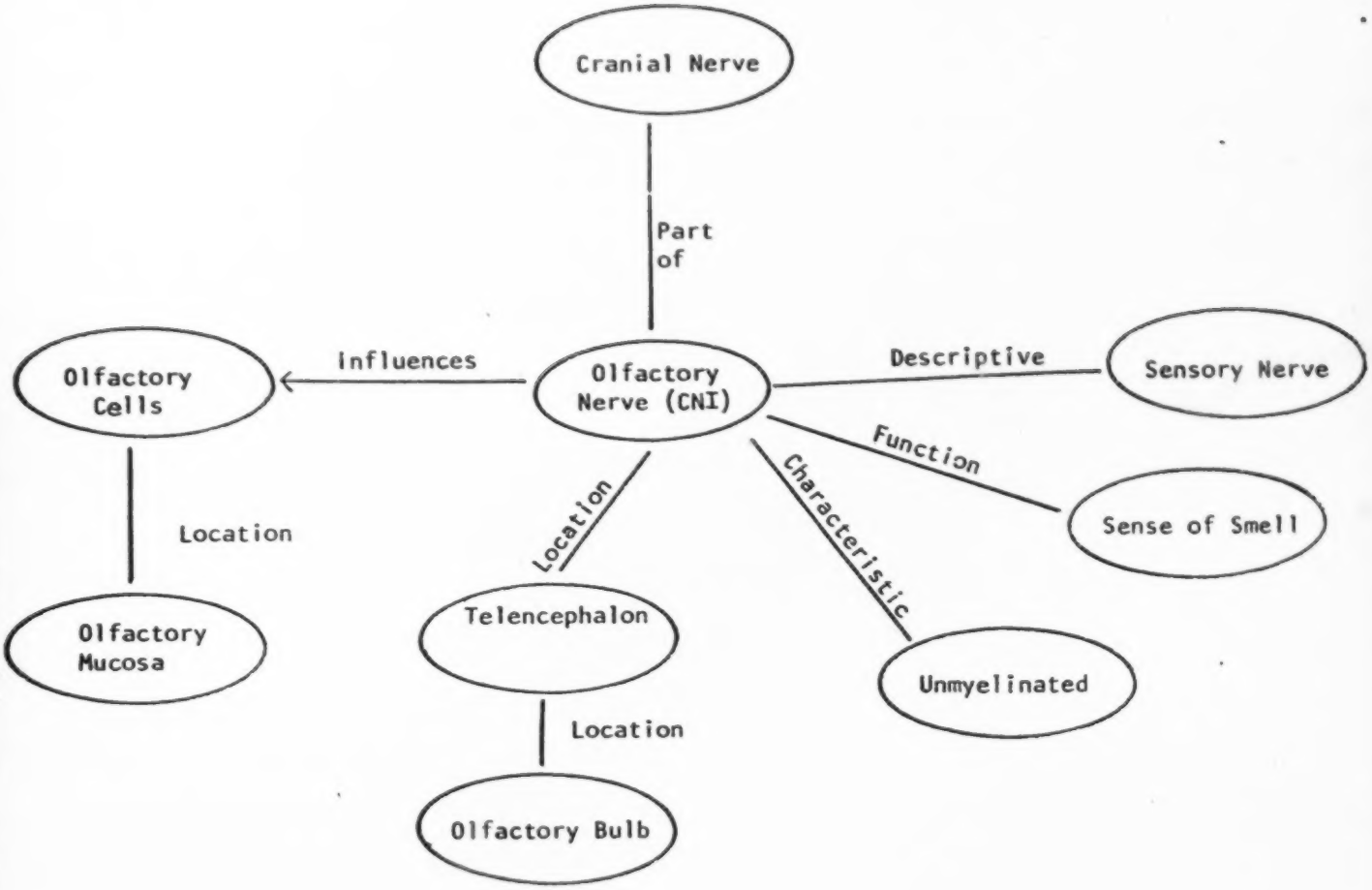
Figure 3 is an example of a network related to the olfactory nerve or the first cranial nerve (CNI) which was part of the mnemonic example on pages 6 and 7. Note however, the greater amount of information associated with the comprehension network than could ever occur through the use of the mnemonic systems described earlier.

You'll find it easier to comprehend a subject when you set out to understand it part by part. Also, you have a better chance of getting useful information when you ask about specific concepts and links within a comprehension network. After constructing a network, it will now serve as a guide and structure for further learning. Moreover, it will also serve as a powerful memory framework. Thus, networking is one of the most effective learning strategies you can employ.

Changing Comprehension Strategies

Keep in mind that often the effects of your comprehension efforts are not immediately obvious. Because complex subjects are, of course, difficult, it may not be obvious that a comprehension strategy is succeeding, even when it is.

FIGURE 3


Cranial Nerve
Part of
Olfactory Cells
Influences
Olfactory Nerve (CNI)
Descriptive
Sensory Nerve
Function
Sense of Smell
Location
Location
Characteristic
Olfactory Mucosa
Telencephalon
Unmyelinated
Location
Olfactory Bulb

This is where self-monitoring becomes critically important. You'll also find that regularly using self-assessment or practice exams can be especially helpful for providing a measure of how much you are learning.

By applying self-monitoring techniques to assess your comprehension, you should be able to recognize those situations when the primary strategy you are using is not sufficient. This will then allow you to shift to another specific comprehension strategy that may be better in facilitating your understanding the material. If the second strategy also seems ineffective, you can then shift to another strategy, that might be more appropriate since you should have several which you can employ. For instance, when confronted with a very pressing deadline, use an organizational strategy. That particular strategy helps develop a memory framework so that you can at least recall the material even if you have not fully understood it.

Conclusion

One of my hopes is that after reading this guide, you will have found many of the suggestions useful and applicable to your particular learning needs. Since effective methods of learning become increasingly important as you progress up the educational hierarchy and take more demanding courses (demanding in the sense of time and amounts of information not to mention complexity), my other hope is that the information contained in the guide will assist you in becoming a more effective learner.

Finally, please keep in mind that successful learning does not depend simply on memorizing, concentrating, or comprehending; it requires you to develop the ability to apply what you have learned for solving particular problems that may be both general and specific in nature, and an active or interactive approach to learning, as discussed here, increases the chance of that occurring.